Space Weather Forecast

Issued on Monday, 12 June 2023 at 01:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate X-ray flares (R1-R2 radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with only common class flares observed, the largest from a sunspot region that is now barely visible as it approaches the western solar horizon. There are eight sunspot regions visible in total, the majority of which are small, simple and stable. The main region of note is a broad collection of smaller spots in the southwest disc. Despite it lacking large main spots, this still has some magnetic complexity that brings the chance of isolated Moderate flares. No Earth-directed coronal mass ejections (CMEs) were observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind was indicative of the connection to a fast wind environment, most likely from either of the coronal holes in the western disc. However there was also some increased interplanetary magnetic field strength that likely occurred due to this, perhaps including a weak CME from 08 Jun at first. Solar wind speeds were initially around 330km/s, then gradually increased from 11/0100 UTC to become slightly elevated from around 11/0715 UTC. Wind speeds have generally trended up to 420-450km/s by the end of the period, with a peak of 479km/s at 11/1950 UTC. The magnetic field strength carried by the solar wind increased from being Weak to become Moderate by 11/0100 UTC, briefly peaking at strong levels around 11/0300 UTC. Since then, an erratic decline has taken place with the magnetic field strength now Weak. The north-south component was initially predominately positive (northward) but with occasional brief rotations to the negative (southward) direction. Periodic, but weak rotations have occurred since around 11/1600 UTC. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be mainly Low with a chance of rising to Moderate with isolated M-flares.

Solar Wind / Geomagnetic Activity: A CME associated with the Moderate flare on 09 Jun, is directed mainly behind Earth but has the potential to give a glancing influence, most likely on day 2 (13 Jun). No other CMEs are currently expected. Ongoing slightly elevated solar winds are expected days 1-2 (12-13 Jun) due ongoing coronal hole sourced fast winds, before easing day 3 (14 Jun). Mainly Quiet geomagnetic conditions are expected with Unsettled spells. There is a slight chance of Active to G1 Minor Storm intervals, mainly late day 1 or day 2 (12 or 13 Jun) with any CME glance that may occur, or interaction with the fast wind of an equatorial coronal hole on day 4 (15 Jun).

Energetic Particles / Solar Radiation: The count rate of energetic particles is forecast to remain at background with no solar radiation storms occurring. Although there is a very slight chance of increased particles counts, if any notable flares were to occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	10	1	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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